

X. APPENDIX

Claims on Appeal:

1. A method of preparing thermally stable transitional alumina stabilized with additions of lanthanum comprising the steps of:
 - a) providing an aqueous solution of an aluminum salt and a lanthanum salt;
 - b) treating the solution with an inorganic hydroxyl group anion-exchanger to produce a composition comprising aluminum hydroxides and lanthanum hydroxides;
 - c) freeze-drying the hydroxide composition to produce an aluminum hydroxide powder containing lanthanum; and
 - d) dehydrating the aluminum hydroxide powder to yield particulates of γ -alumina stabilized with lanthanum.
2. The method of claim 1 wherein the salt of aluminum is aluminum nitrate.
3. The method of claim 2 wherein the aqueous solution comprises 1 M $\text{Al}(\text{NO}_3)_3$.
4. The method of claim 1 wherein the aluminum hydroxide composition has a pH of about 6 to about 8.
5. The method of claim 1 wherein said dehydrating step comprises (i) heating the aluminum hydroxide powder to a temperature of about 600°C to about 800°C to produce γ -alumina and (ii) cooling the γ -alumina.

6. A method of preparing thermally stable transitional alumina stabilized with additions of lanthanum comprising the steps of:

- a) providing an aqueous solution of an aluminum salt and a salt of a lanthanide series element;
- b) treating the solution of aluminum and lanthanide series element with an inorganic hydroxyl group anion-exchanger to produce a composition comprising aluminum hydroxides and hydroxides of the lanthanide series element;
- c) freeze-drying the hydroxide composition to produce a powder comprising the aluminum hydroxides and the hydroxides of the lanthanide series element; and
- d) dehydrating the powder to yield particulates of thermally stable γ -alumina containing the lanthanide series element.

7. The method of claim 6 wherein the aluminum salt comprises aluminum nitrate.

8. The method of claim 7 wherein the salt of a lanthanide series element comprises lanthanum nitrate.

9. The method of claim 8 wherein a molar ratio of aluminum to lanthanum in the aqueous solution is about 0.0003 to about 0.03.

10. The method of claim 9 wherein a molar ratio of aluminum to lanthanum in the aqueous solution is about 0.001 to about 0.003.

11. The method of claim 8 wherein the concentration of lanthanum oxide in the γ -alumina is about 0.1 to about 0.3 mol%.

12. The method of claim 6 wherein the aluminum hydroxide composition has a pH of about 6 to about 8.

13. The method of claim 6 wherein said dehydrating step comprises (i) heating the aluminum hydroxide powder to a temperature of about 600°C to about 800°C to produce γ -alumina and (ii) cooling the γ -alumina.